

WISCONSIN STATEWIDE TRAUMA CARE SYSTEM REPORT

January 2001



**Wisconsin Department of Health and Family Services
Division of Public Health
Bureau of Emergency Medical Services and Injury Prevention
Statewide Trauma Advisory Committee**

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STATEWIDE TRAUMA SYSTEM REPORT - EXECUTIVE SUMMARY

The purpose of the Statewide Trauma Care System Report is to establish a conceptual framework from which a Trauma Care System can be developed. By law, the Department of Health and Family Services (DHFS) is the lead agency for the plan development and system implementation, working in conjunction with the Statewide Trauma Advisory Council. This report is meant to be an evolving document as a system of trauma care in Wisconsin becomes a reality and is refined as dictated by patient needs.

This Report is the culmination of a decade of activity. The enabling legislation, WI 1997 Act 154, is the result of both national and state evaluations that pointed to the need for a trauma system in Wisconsin. National and state data show that injury is a public health problem of enormous proportions. It is the leading cause of death for people ages 1 – 44 and is the fourth leading cause overall. The goal of a trauma care system is to reduce suffering, disability, death and the cost associated with traumatic injury.

WI 1997 Act 154 created a Statewide Trauma Advisory Council (STAC) to prepare a final report on specific recommendations for developing and implementing the trauma care system. The STAC, in conjunction with the Department of Health and Family Services, was charged with submitting the report by January 1, 2001. It is the Department's responsibility to implement the system by July 2002.

The STAC created five sub-committees to address the components of the legislation. Due to the open format that was utilized for the structure of the sub-committees, many individuals throughout the State were able to participate. The work of the sub-committees includes:

Classification & Verification of Hospital Resources. Hospital capabilities will be evaluated to ensure patient condition will be matched with the appropriate hospital resources. This will be accomplished by using the American College of Surgeons

verification process for Level I and Level II trauma care facilities and a self-verification checklist for Level III and Level IV hospitals.

Out-of-Hospital Care Issues. There is a need for the following:

- ◆ Minimal standards for Adult and Pediatric Scene Triage Guidelines for Out-of-Hospital patients
- ◆ Interfacility transfer guidelines
- ◆ Medical control standards for the trauma patient (Protocols)
- ◆ Emergency Medical Services trauma care education
- ◆ Statewide enhanced 911
- ◆ Emergency Medical Dispatch certification for anyone dispatching medical calls
- ◆ Evaluation and continuous performance improvement mechanisms.

These issues will be addressed by coordinating input from the Statewide Trauma Advisory Council, Regional Trauma Advisory Councils and DHFS.

Trauma Registry. Due to a variety of existing data sources and a number of trauma registry software products in use by hospitals, the STAC recommends that a consultant be hired to provide input on how to make optimal use of existing data, and recommend a system for future data collection. Initial implementation would be through mandatory and systematic injury data collection, with Level I and II hospitals maintaining computerized trauma registries and contributing their data to a centralized, statewide repository. Level III and Level IV Trauma Centers will collect and submit data on “major trauma patients”. Data collection and submission to the Wisconsin State Trauma Registry will occur in phases over several years.

Injury Prevention, Education and Training. The STAC identified three main groups to be targeted for education and training in injury prevention:

- 1) the general public to increase awareness and educate on prevention activities

- 2) providers of health care to injured patients to increase their knowledge of the trauma system and provide ongoing continuing education
- 3) policymakers to educate them about the trauma system and to encourage them to be advocates for prevention and system development and support.

Activities to address these three focus groups will be developed by the STAC, Regional Trauma Advisory Councils (RTACs) and the existing and requested State coordinating positions.

Evaluation and Performance Improvement. A performance improvement (PI) plan will be included as part of the evaluation. The purpose of the trauma system is to improve care, affect outcomes, reduce mortality and morbidity and correct regional injury problems. Evaluation will include facility and regional PI and also system-based PI to examine the overall functioning of the system. Regional Trauma Advisory Councils (RTACs) need to be created and will be key in developing and implementing a statewide trauma care system. The evaluation system will be phased-in to allow for gradual growth that does not overload limited resources.

The STAC identified three crucial areas that need to be addressed for to ensure the success of the Statewide Trauma Care System Report. These items are:

Regional Trauma Advisory Councils - Probably the most important infrastructure need is the support of Regional Trauma Advisory Council (RTAC) activities, which include protocol development, education, data analysis and performance improvement. The RTACs are key to the system because the majority of the implementation and evaluation of the system will be done at the local or regional level. Any support that strengthens the regional structure will be influential in assuring success of the system.

Funding Sources: The Report includes proposals for possible mechanisms to fund the Trauma Care System, both administratively and operationally. Securing a dedicated

source of reliable income will be essential for the success of a Statewide Trauma Care System for Wisconsin

Legislative Approval - Through submission of this report, the Statewide Trauma Advisory Council (STAC) and the Department of Health and Family Services (DHFS) are requesting legislative approval and financial support. The following are specific legislative steps for development and implementation.

- (1) Approval of the Report to allow for rule writing to proceed for:
 - ◆ Verification or self-classification of hospital capabilities.
 - ◆ Requirements that Regional Trauma Advisory Councils (RTACs) be formed.
 - ◆ Investigative review process for issues brought forward by the regional councils related to hospital capabilities.
 - ◆ Requirements for data submission.
- (2) Statutory language to create 2.0 FTE, one to serve as the Trauma Registrar and an Injury Education Coordinator to assist the RTACs with injury prevention activities.
- (3) Statutory language to fund a contracted consultant to determine the most cost-effective way to collect and be able to analyze injury data from the trauma system.
- (4) Statutory language directing how confidential injury data can be used and that injury data being used for performance improvements in the trauma system be limited to confidential peer review only.
- (5) Statutory language for the STAC to continue beyond their sunset date of July 1, 2002. This request is being made so that the STAC can assist with development of Regional Trauma Advisory Councils and full implementation of the system as well as serve as an evaluation and performance improvement committee.
- (6) Statutory language to create an additional \$1 surcharge on vehicle registration to fund the system and associated costs.

ACKNOWLEDGEMENT

Many individuals were involved in the development of this report. Without their contributions, this Report would never have been possible. The following is a list of those individuals that participated in the development of this report.

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INTRODUCTION

WHAT IS A TRAUMA CARE SYSTEM?

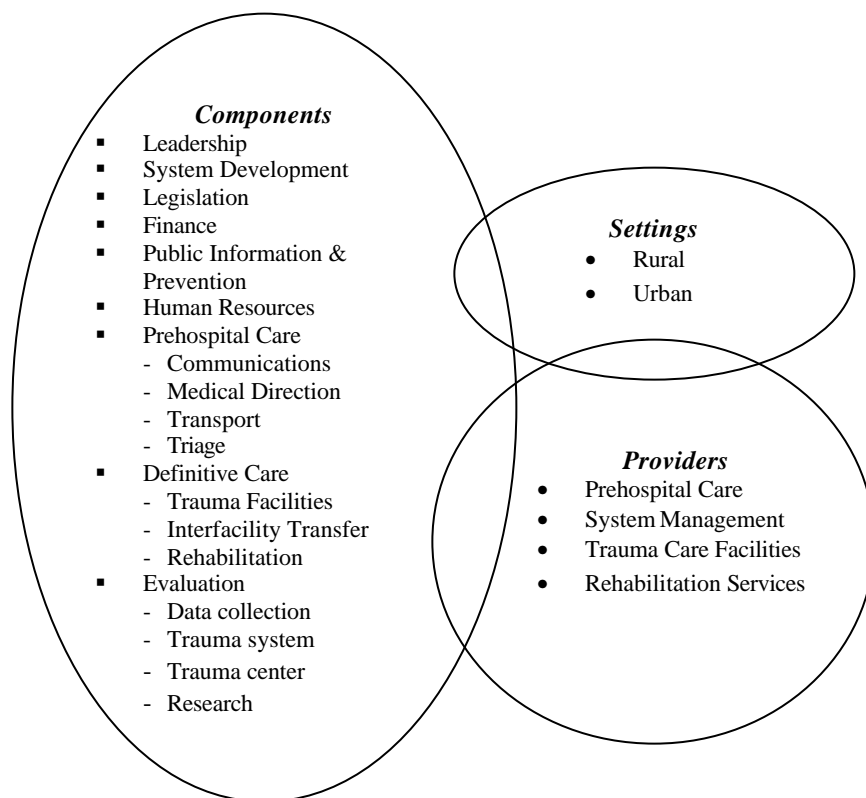
A *Trauma Care System* is more than availability of ambulance services and hospital emergency departments. In its 1988 report, the National Highway Traffic Safety Administration defines a *Trauma Care System* as “a system of health care delivery that combines prehospital Emergency Medical Services (EMS) resources and hospital resources to optimize the care, and therefore, the outcome of traumatically injured patients”. A *Trauma Care System* is a continuum of care from initial injury detection through definitive care including rehabilitation and injury control. It provides a comprehensive approach to the triage, treatment, transport, and ultimate care of major trauma victims. The American College of Surgeons Goldbook (ACS) defines a *Trauma System* as being composed of four primary patient components: **access to care, prehospital care, trauma hospital care, and rehabilitation.**

- 1) **Access to care** implies that all users of the system, including the patient, know how to access the system. The most notable form of access is the 911 universal access emergency telephone number.
- 2) **Prehospital care** (which will be referred to throughout this document with the most recently accepted terminology of **Out-of-Hospital care**) focuses on ambulances, emergency personnel, and emergency equipment and transport. Most states, including Wisconsin, do an adequate job of responding to out-of-hospital emergencies, trauma included. Out-of-hospital equipment and training of the responders are generally the same. Advanced care in the out-of-hospital phase has increased significantly throughout Wisconsin, but at this point, the system starts to break down. The injured patient may or may not reach the right hospital for his/her particular injury in a timely fashion.
- 3) **Trauma hospital care** implies that each facility has been assessed with regard to its ability to care for major trauma patients so that getting the right patient to the right hospital in the right amount of time is assured. Additionally, optimal hospital care

requires commitment from each of the facilities, the medical staff and all support personnel.

- 4) **Rehabilitation** for surviving victims of trauma must be provided. It is not efficient nor cost effective to develop sophisticated out-of-hospital and hospital care to treat severely injured patients only to transfer the patients to custodial facilities without adequate rehabilitation.

Figure 1 is the Trauma System Model that was adapted from the 1992 American College of Emergency Physicians (ACEP), *Guidelines for Trauma Care Systems*. This model serves to delineate the components and providers that are essential to urban and rural trauma systems.



Adapted from ACEP Policy Statement Guidelines for Trauma Care Systems, 1992

Figure 1: Trauma System Model

THE TRAUMA SYSTEM

The ideal trauma system is designed to care for all injured patients with specific attention to the victims of major trauma. ACEP (1992) recognizes that trauma care represents a continuum of care that is ideally provided in an integrated system with close cooperation among providers in each phase of treatment. A trauma care system acknowledges this continuum and therefore reduces mortality and morbidity, and improves quality. Numerous studies have shown regionalized systems of trauma care demonstrate improved survival rates for the injured population.

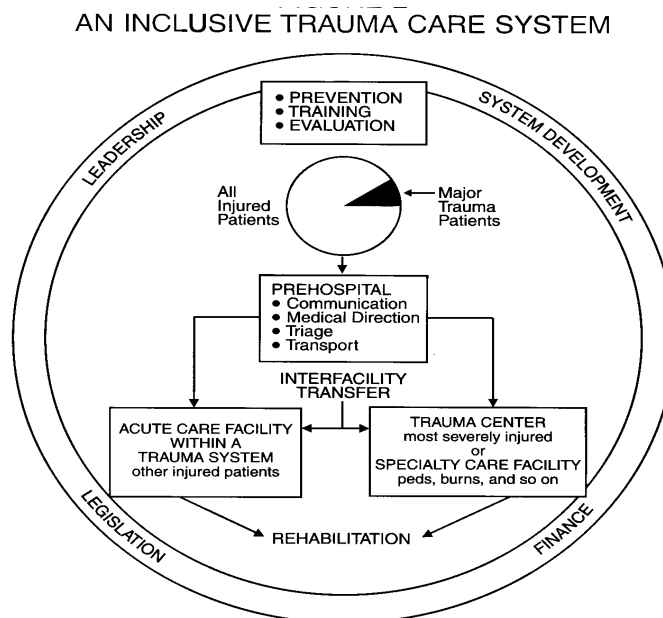
An inclusive system is one in which every health care provider and health care facility participates. Input from each of these participants is essential in developing a Report and establishing a functional system. An inclusive system recognizes not only severely injured patients, and the facilities that care for them, but also recognizes the significance of other hospitals within the system that care for the majority of injured patients. The Model Trauma Care System Plan (1992) defines the goal of an inclusive trauma system as one that matches the resources of each trauma care facility to the needs of injured patients. This will result in every patient receiving optimal care from the initial recognition of the injury through return to the community.

THE MODEL TRAUMA CARE SYSTEM PLAN

In 1990, Congress passed legislation requiring the development of a Model Trauma Care System Plan to serve as a template for statewide trauma system development. This plan, first published in 1992, identifies all the necessary components of a system that is designed to meet the needs of all injured patients (see Figure 2).

Each section of this document highlights a component of an inclusive trauma care system that by intent either provides or facilitates the delivery of optimal care to the injured patient. The Department of Health and Family Services with the Statewide Trauma Advisory Council

(STAC) utilized the Model Trauma Care Systems Plan to guide the development of the Wisconsin Statewide Trauma Care System Report.



Adapted with permission from Bureau of Health Services Resources, Division of Trauma and Emergency Medical Services: *Model Trauma Care System Plan*. Health Resources and Services Administration, U.S. Department of Health and Human Services, Rockville, MD, 1992.

Figure 2

The National Highway Traffic Safety Administration (NHTSA), charged with reducing death and injury on the nation's highways, has assisted states with the development of integrated emergency medical services (EMS) programs that include comprehensive systems of trauma care. The Technical Assistance Team (TAT) of the NHTSA was developed to support the technical evaluation of existing and proposed emergency medical services programs. TAT, comprised of technical experts in emergency medical service development and implementation, has assisted many states in their evaluation of EMS. In 1990, at the request of DHFS, a Technical Assistance Team from the NHTSA evaluated the Wisconsin EMS System. The results of their assessment identified several weaknesses. Specifically, in regard to trauma system development, the NHTSA team recommended:

- ◆ Enact comprehensive trauma system legislation including, but not limited to designation of trauma centers, evaluation and verification of trauma systems, and establishment of triage and transfer criteria/protocols.
- ◆ Establish authority for the regulation of interhospital transfers.
- ◆ Provide adequate, ongoing, state funding support for EMS program activities, e.g., central and regional staffing, trauma care systems development, communications, and training.
- ◆ State EMS Section staffing should be increased or established at state and regional EMS system levels to address identified needs areas such as:
 - State EMS medical direction
 - Trauma care systems development
 - Inspection and licensure
 - Investigation
 - Data collection and evaluation
 - Public information and education
 - Communications
 - Comprehensive planning
 - Training.
- ◆ Regionalize coordination of EMS system components, under the direction of the State EMS Section.

NATIONAL STANDARDS

The American College of Surgeons (ACS) has long been a leader in the development of systems of trauma care. The American College of Surgeons (ACS) Committee on Trauma, established in 1922, is the oldest standing committee of the ACS, and has focused its attention on improving the care of the injured patient. Since 1976, the ACS has published guidelines describing optimal resources for the care of the injured patient. Subsequent revisions, the last dated 1999, have demonstrated the continued commitment of the ACS to refine guidelines for optimal care of the injured patient.

Other organizations have followed suit, demonstrating a similar commitment. The American College of Emergency Physicians (ACEP) first introduced guidelines for trauma care systems in 1987. These guidelines were established to assist regions to plan, implement, and evaluate trauma care systems. The American Pediatric Surgical Association (APSA) believes that comprehensive care of an injured child can best occur within an organized trauma system. To support this assertion, the APSA published a statement of basic principles in 1992 outlining necessary components of a pediatric trauma system. In 1990, the American Burn Association (ABA) published *Hospital and Prehospital Resources for Optimal Care of Patients with Burn Injury: Guidelines for Development and Operation of Burn Centers*.

The rehabilitation of the injured patient is an integral component of a comprehensive trauma care system. In recognition of this, the Commission for Accreditation of Rehabilitation Facilities (CARF), serving as the standard-setting and accrediting body for rehabilitation centers, has developed specific program standards for rehabilitation of injured patients, including spinal cord and brain injury programs.

Many other national health care provider organizations have supported the development of systems of trauma care. Nursing organizations include the Emergency Nurses Association (ENA), the American Association of Critical Care Nurses (AACN), the Association of Operating Room Nurses (AORN), and the National Flight Nurses Association (NFNA).

TRAUMA CARE SYSTEM DEVELOPMENT - WISCONSIN

Based on the 1990 NHTSA assessment and its recommendations, a Special Legislative Study Committee on EMS was established. This committee recommended that legislation be drafted to address many of the issues identified in the NHTSA review. Completion of the committee's work involved passing legislation (1993 WI Act 251) in April 1994.

1993 Act 251, along with associated legislation in WI 1993 Act 16, assigned several new responsibilities to DHFS and a newly appointed EMS Advisory Board. These responsibilities

included preparing ten legislative reports, one of which read: *Recommendations for a Trauma System: A report that sets forth recommendations, including any necessary proposed legislation, for development of a statewide trauma system.* The trauma report was delivered to the Legislature in December 1996.

The trauma report was the impetus for legislation (WI 1997 Act 154) to create a Statewide Trauma Advisory Council and prepare a final report on specific recommendations to develop and implement the trauma system. The Council was appointed by DHFS Secretary Joe Lekan in 1999 and met monthly in 2000 to prepare this report. Refer to Figure 3 for a summary of Trauma Care System development in Wisconsin.

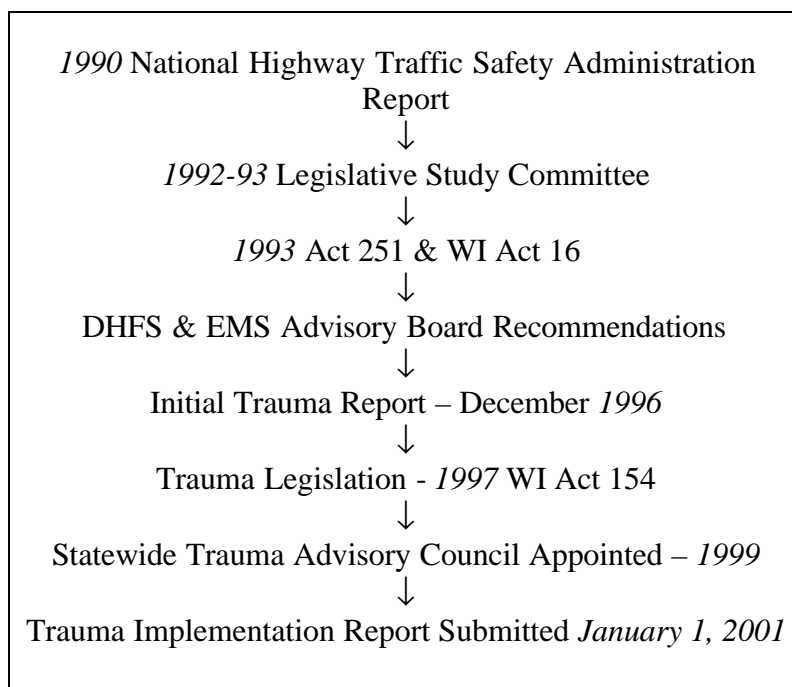


Figure 3 - Summary: Trauma Care System Development in Wisconsin

ADMINISTRATIVE COMPONENTS

LEGISLATION

1997 Wisconsin Act 154 laid the groundwork for creating a statewide trauma care system (Refer to Appendix A- Act 154). 1997 WI Act 154 and follow-up legislation included in 1999 WI Act 9 required creation of the following:

146.56(1)

Not later than July 1, 2002, the department shall develop and implement a statewide trauma care system. The department shall seek the advice of the statewide trauma advisory council under s. 15.197(25) in developing and implementing the system.

146.56(2)

The department shall promulgate rules to develop and implement the system. The rules shall include a method by which to classify all hospitals as to their respective emergency care capabilities. The classification rule shall be based on standards developed by the American College of Surgeons. Within 180 days after promulgation of the classification rule, and every 4 years thereafter, each hospital shall certify to the department the classification level of trauma care services that is provided by the hospital, based on the rule. The department may require a hospital to document the basis for its certification. The department may not direct a hospital to establish a certain level of certification.

The legislation also contained two nonstatutory provisions: 1) a report be written and 2) the report be submitted to the legislature, the governor, the EMS Board and the Joint Committee on Finance. The Joint Committee has the responsibility for review and approval of the report. The language outlines the following:

(1) By January 1, 2001 submit a report on the development and implementation of a statewide trauma care system. The report shall make recommendations on issues that need to be resolved in developing and implementing the system, including:

- ◆ minimum services in rendering patient care
- ◆ transport protocols
- ◆ area trauma advisory councils and plans
- ◆ development of a method to classify hospital emergency care capabilities and methods to make the information available for public use
- ◆ improving communication systems between hospital and prehospital elements of the trauma care system
- ◆ development of a statewide injury registry, including a data system to measure the effectiveness of trauma care and to develop ways to promote ongoing quality improvement
- ◆ triage
- ◆ interfacility transfers
- ◆ enhancing the education and training of health care personnel involved in the provision of trauma care services
- ◆ monitoring adherence to rules

(2) The department of health and family services shall submit the report under subsection (1) to the joint committee on finance of the legislature for its review under section 13.10 of the statutes. The department of health and family services may not submit the rules under section 146.56(2) of the statutes as created by this act, to the legislative council staff for review under section 227.15 of the statutes until the joint committee on finance approves the report under subsection (1).

Through submission of this report, the Statewide Trauma Advisory Council (STAC) and the Department of Health and Family Services (DHFS) are requesting legislative approval. Specific legislative steps for development and implementation are the following:

- (1) Approval of Report to allow for rulemaking to go forward for:
 - ◆ Verification or self-classification of hospital capabilities
 - ◆ Requirements that Regional Trauma Advisory Councils (RTACs) be formed according to the guidelines to be developed by the STAC and approved by the Bureau EMSIP
 - ◆ Investigative review process for issues brought forward by the regional councils related to hospital capabilities
 - ◆ Requirements for data submission
- (2) Statutory language to create an additional 2.0 FTE's to serve as the Trauma Registrar and Injury Education Coordinator to assist the RTACs with injury control activities. These positions are in addition to the Statewide Trauma Coordinator which was provided by Act 154.
- (3) Statutory language to fund a contracted consultant to determine the most cost-effective way to collect and be able to analyze injury data from the trauma system.
- (4) Statutory language directing how confidential injury data will be utilized. The language should emphasize that injury data being used for performance improvements in the trauma care system be limited to confidential peer review only.
- (5) Statutory language for the STAC to continue beyond their sunset date of July 1, 2002 to July 1, 2004.
- (6) Funding source language.

Process and Timetable

The Statewide Trauma Advisory Council (STAC) was appointed in December 1999 and began meeting monthly in February 2000. The Council is comprised of 13 members representing physicians, nurses, urban and rural hospitals, EMS providers and the EMS Advisory Board.

The Council created five sub-committees to address the guidelines for the required components (which were established by Act 154 legislation) for inclusion in the Statewide Trauma Care System Report. The five sub-committees and their objectives were:

1. **Classification & Verification of Hospital Resources:** to develop a method to classify hospitals as to their respective emergency care capabilities; a method to make the resulting information available for public use; and identification of minimum services for caring for injured patients.
2. **Out-of-Hospital Care Issues:** to develop triage and transport guidelines; interfacility transfer guidelines; and to identify a method to improve communication systems between hospitals and out-of-hospital elements of the trauma care system.
3. **Trauma Registry:** to develop a statewide trauma registry, including a data system to measure the effectiveness of trauma care.
4. **Education and Training:** to develop methods to enhance the training and education of the “3 P’s”--public, providers, and policymakers--regarding trauma care and injury prevention.
5. **Evaluation and Performance Improvement:** to develop methods to promote ongoing performance improvement; trauma advisory councils and plans; and adherence to the rules.

The sub-committee work resulted in specific recommendations for the development and implementation of a Statewide Trauma Care System Report for the State of Wisconsin. Specific details of the implementation phase will continue to be developed by the State Trauma Advisory Council (STAC).

The timeline for the Initial Statewide Trauma Care System Report is summarized below.

2000

February	Initial STAC meeting
March	Beginning of sub-committee work
April-August	Sub-committees prepare their portion of the Report
September	Initial draft of sub-committee reports for full STAC committee discussion, including recommended changes
October	Second draft of sub-committee reports in response to STAC recommendations. STAC committee discussion and approval of reports
November	Final draft prepared of entire document with all sub-committee reports integrated into one Report. Discussion and approval by STAC and Report is forwarded to DHFS for review.
December 2000	Report is sent back to STAC with any comments from DHFS. Final approval is given by STAC. The Report is sent back to DHFS for final preparation and submission to legislature.

2001

January	STAC continues working on implementation process Legislature receives Report and discusses recommendations
February-April	Legislature approves all or parts of the Report. Any necessary legislation, rule or budget provisions are introduced
May	DHFS initiates rulemaking process. STAC sub-committees provide input.
May 2001-May 2002	All the necessary materials, documents, data systems and evaluation methods need to be developed by sub-committees and DHFS

2002

January	Rules are finalized and go to hearing
April	Rules are approved

July Phased-in implementation of the Wisconsin Statewide Trauma Care System begins

LEADERSHIP

Lead Agency:

Development and implementation of a statewide trauma care system requires designation of a lead agency that is responsible for coordination of the system. The Department of Health and Family Services, Bureau of Emergency Medical Services and Injury Prevention (BEMSIP) will serve in the role of lead agency.

The Bureau of EMSIP is the primary leader for the trauma care system because it interacts with many of the components necessary for a trauma system. The Bureau has ongoing working relationships with out-of-hospital and hospital health care providers as well as medical and professional organizations. The Bureau of EMSIP also receives input and recommendations from several related advisory bodies and a State EMS Medical Director. An organizational chart is included as Appendix B.

The various advisory groups to the Bureau of EMSIP have been used in some capacity in development of the trauma Report. Previous reports by the EMS Board were reviewed to aid the STAC in their discussions and decisions. The Bureau of EMSIP will serve a number of roles in coordinating the Statewide Trauma Care System. These roles will include:

- ◆ Rulemaking and regulatory authority where appropriate
- ◆ Integration of a trauma care system within existing resources
- ◆ Oversight of the trauma verification and classification system for hospitals
- ◆ Assistance with developing injury prevention, training and education programs for the 3 P's: public, providers, and policymakers
- ◆ Development and implementation of an injury data collection system and maintenance of a State Trauma Registry
- ◆ Oversight of a statewide trauma performance improvement program

- ◆ Administrative support for STAC and the Regional Trauma Advisory Councils
- ◆ Encourage public and private support of the Statewide Trauma Care System

Advisory Bodies:

Statewide Trauma Advisory Council (STAC). The Statewide Trauma Advisory Council, comprised of 13 members, is the primary resource in developing and implementing the Statewide Trauma Care System. The STAC has been instrumental in providing information for the Report and will continue to function over the next 18 months to provide input on the specific details needed for rule development and related documents that clarify how the system will function. The STAC is also requesting that their sunset date of July 1, 2002 be extended for the following reasons:

- ◆ implementation of the system will be phased-in well beyond the initial implementation date of July 1, 2002
- ◆ there will be an ongoing need for a system performance improvement oversight body
- ◆ the STAC would like to assist in both those functions since the early success of the system will be dependent on close monitoring and evaluation.

EMS Advisory Board. The EMS Advisory Board is a 14-person governor appointed board that has been in existence since 1993. The EMS Advisory Board provides general advice to the department including review of rule changes, advice on EMS funding assistance program dollars and appointment of an advisory group of emergency care physicians. The EMS Advisory Board has five standing committees: policy and practice, systems development, education, data and EMS for Children. The EMS Advisory Board works closely with the Physician Advisory Committee (PAC) and the State EMS Medical Director in reviewing medical practice issues. An EMS Advisory Board representative is also a member of the STAC to help assure crossover of information between the committees.

Physician Advisory Committee. The Physician Advisory Committee (PAC) is a nine-member physician committee that advises the department on out-of-hospital and interfacility medical care issues. The PAC is the resource used for medical advice and medical practice issues.

The State EMS Medical Director. The State EMS Medical Director is a contracted position that provides direct medical advice to the department and also serves on the STAC, EMS Board and EPAC. This interaction by the State EMS Medical Director, as well as key bureau staff, assure sharing of information and coordination across all advisory groups.

FINANCE

Funding and support issues will be a key component of a trauma system. Legislative appropriation for the establishment of a Statewide Trauma Care System is \$80,000, which includes one position (Statewide Trauma Coordinator). STAC believes this to be inadequate for the implementation of Wisconsin's Statewide Trauma Care System. Trauma system expenses must be considered in the context of cost savings for lives saved and return of injured persons to productive lifestyles. This type of ultimate cost effectiveness has been noted in established trauma systems.

The most important infrastructure need is the support of Regional Trauma Advisory Council (RTAC) activities, which include protocol development, education, data analysis and performance improvement. Since many key components of the trauma system hinge on a fully functional RTAC, this area needs to be supported.

The initial and ongoing costs for a trauma system will fall into two primary groups: the coordinating agency for statewide implementation and the system providers of health care and their related facilities. The STAC has made a number of recommendations that require resources. Some of these recommendations require new resources, while others require in-kind contributions by existing sources or partners. In either case, creating a formal trauma system is only possible with specialized support.

State Coordinating Agency Needs:

This report recommends coordination of many of the trauma system activities by a State-coordinating agency and through Regional Advisory Councils (RTACs). The State resources are easier to quantify because the State's role is more clearly defined than the role of the regional councils. The State personnel needs, in addition to the Statewide Trauma Coordinator, have been identified as a Trauma Registrar, an Injury Education Coordinator, and a one-time contracted consultant to evaluate and report on the best way to establish a trauma data system.

Recommendations for State Administrative resources:

1. Funds for a consultant to determine what data resources that contain trauma information are currently available and what is the most cost-effective way to develop a trauma registry. The estimated cost of this recommendation is \$40,000.
2. Funds for 1 FTE to serve as the State Trauma Registrar to coordinate collection and analysis of trauma data.
3. Resource needs to develop and support injury education programs in the State. Funds to support an additional FTE to be used as a State Injury Education Coordinator to develop and coordinate injury education programs conducted through the regional structure.
4. Future costs for a data system. This future cost will be determined by the contracted analysis recommended above.

The *contracted trauma data evaluation consultant* would expand on the work of the Injury Registry Committee and make recommendations on the best and most cost-effective way to collect and analyze injury data. This contracted position would evaluate the current data systems already in place and recommend the best way to implement and standardize an injury registry statewide. In addition, the consultant would initiate preliminary work on setting up the system. This system would be phased-in over several years. It is likely that the recommendations for a system will also require funds to develop a software platform or a software conversion package to create a means to collate data from existing software packages.

The *State Trauma Registrar* will be responsible for developing and implementing a statewide trauma database. That would include taking the recommendations from the STAC and the contracted data specialist to set up an initial system. Early work by this position will involve overseeing development of a data collection system and educating the providers of data and other interested parties of the purpose of the trauma care system. Later work will involve collection and analysis of the data, while maintaining confidentiality, and sending reports back to the regions for them to use in their performance improvement process and to identify focused education efforts. This position will work very closely with the *Statewide Trauma Coordinator*.

The *State Injury Education Coordinator* position will serve multiple functions. With the Statewide Trauma Coordinator and State Trauma Registrar, the position will supplement regional activities, assist with Performance Improvement activities, and develop injury training and education programs.

Regional Resources & Organizations Needs:

Resources for providers and facilities will also be a key component of the trauma system. Level I and Level II hospitals have trauma nurse coordinators who facilitate many of the trauma activities for the hospital. They could also assist with activities for the Level III and Level IV hospitals. Hospitals may have to increase the number of staff that currently provide chart abstraction and secretarial support. All participants in the trauma care system need to be represented on the Regional Trauma Advisory Councils (RTACs). This representation might be an individual from each provider involved in the region or it could be a designated individual who represents several providers. In either case, there will be a time commitment and travel expenses involved with the participation on the RTACs.

Roles of the Regional Trauma Advisory Councils (RTACs) will include:

- ◆ Development and evaluation of local protocols
- ◆ Development of working agreements between local providers

- ◆ Data collection with local and regional analysis of data
- ◆ Performance improvement through case review and data analysis
- ◆ Development of injury prevention and education strategies
- ◆ Education and training of regional EMS and dispatch providers

These and other activities of the Regional Trauma Advisory Councils will require a time commitment and some financial commitment from the involved organizations and the State. The RTACs are key components of the trauma care system since a great deal of the implementation and evaluation of the system will be done at the local or regional level. Any support that strengthens the regional structure will be influential in assuring success of the system.

The STAC recommendations to establish the following statewide activities that will affect providers are:

1. The verification process for a Level I and Level II hospital results in a site visit and evaluation by an outside review team. That cost is to be the financial responsibility of the hospital.
2. The self-classification process for Level III and Level IV hospitals results in the completion of a report by the hospital. That report is forwarded to DHFS and the time and personnel necessary to complete the report is the responsibility of the hospital.
3. The costs associated with creation and maintenance of regional councils include use of the meeting site and associated expenses (meals, travel, etc) as well as inkind contributions of time by the representatives. The STAC felt that the cost of the meetings could be shared by the representatives, but recommends general funding for travel, time, and administrative support to facilitate the regional meeting structure.
4. Certification of public service answering centers and certification of emergency medical dispatchers who work in the answering centers. Costs for training and certification are being studied and will be part of a related report from the Emergency Medical Services Advisory Board.

STAC RECOMMENDED FUNDING SOURCES

The Statewide Trauma Advisory Council recommends that a mechanism to fund the Statewide Trauma Care System, both administratively and operationally, be included. Securing a dedicated source of reliable income is essential to the success of the Report. The STAC reviewed several sources and also focused on the need not only for stable trauma system funding, but also Emergency Medical Services as a whole since trauma will be integrated administratively within the Bureau of EMS and Injury Prevention. The STAC considered strategies that would link the funding mechanism to the causes of trauma, such as fees on vehicles or alcohol. Other states such as Pennsylvania and California have assessed fees for moving violations and Virginia has placed additional fees on license tags. (Refer to Appendix C - Other States Trauma Funding Sources) Possible funding sources identified:

- ◆ The council recommends that \$1 be added to vehicle registration fees to cover the proposed resources needed for the trauma system and all current administrative costs for the Bureau of EMS and IP. It was recommended that remaining revenue generated by this \$1 fee be used towards grants that fund projects by the RTACs or other providers. A breakdown of these costs is listed below.

Proposed use of funds to meet current and requested needs:	
1. Funding to cover positions requested in the Trauma Report	
▪ Trauma Registrar - - salary and related expenses	\$80,000
▪ Injury Education Coordinator- salary and related expenses	\$80,000
▪ One-time Consultant	\$40,000
2. Funding to support Regional Trauma Advisory Councils.	\$50,000
Figure based on estimated 10 regions with 30 people per region meeting Quarterly. $300 \times 4 = 1200$. Covered expenses of lunch at \$8 per person $\times 1200$ (\$9,600) plus mileage estimated at 100 miles round trip @ \$.29/mile $\times 1200$ (\$34,800) = \$44,400. Rounded to \$50,000.	
3. Transfer all EMS and Injury positions off of GPR, Prevention and MCH funding. Based on full staffing and funding.	\$ 1,100,000
4. Add First responder coordinator to address statutory requirement	\$60,000
5. Change EMS-Funding Assistance Program formula to increase or expand aid to providers (current amount is \$2,200,000).	\$3,000,000

6. Allocate remaining funds to support RTACs through grants or funding for computer hardware or software needs.	\$290,000
Total	\$4,700,000*

** 1999 Number of WI motor vehicle registrations*

Alternative funding sources:

- ◆ An additional \$1 on every driver's license renewal
- ◆ General Purpose Revenue funds.

OPERATIONAL AND CLINICAL COMPONENTS

OUT-OF-HOSPITAL CARE

An essential element of a trauma system is the coordination between out-of-hospital and hospital components of the Emergency Medical Services (EMS) system. The care delivered should be coordinated to achieve maximum benefit to the patient. The steps taken by out-of-hospital providers in the first few minutes after a traumatic event significantly affect the patient's eventual outcome. The importance of out-of-hospital care in a trauma system cannot be overemphasized.

The out-of-hospital components of a trauma care system should provide easy access, prompt response by qualified professionals responsible for assessment, stabilization, triage and transport to the nearest appropriate trauma care facility. Out-of-hospital care within a trauma system should utilize appropriate treatment protocols, and guidelines for triage and transport of trauma patients. In order to assure that trauma patients in Wisconsin receive timely and appropriate care, the EMS Systems & Licensing Section will oversee a system that maintains:

- ◆ Out-of-hospital scene adult trauma triage guidelines
- ◆ Out-of-hospital scene pediatric trauma triage guidelines
- ◆ Interfacility transfer guidelines for the injured patient
- ◆ Medical control standards for the injured patient (Protocols)
- ◆ Out-of-hospital trauma care education
- ◆ Evaluation and performance improvement mechanisms.

COMMUNICATION

Communication systems provide essential coordination among the components of the EMS and trauma care system. Communication includes access to care, dispatch, communication system integration and quality management. Enhanced 911 is the best form of access to prompt trauma care. Enhanced 911 enables the caller's location to be automatically displayed on a computer

screen which promotes the ease of location of the trauma scene, even if the caller is unfamiliar with the area. Appendix D demonstrates the extent of Enhanced 911 coverage in Wisconsin. Seventy-one (71) of the seventy-two (72) counties (the exception being Iron County) will have Enhanced 911 coverage by the close of 2002.

Effective and timely communication between the out-of-hospital providers and the receiving trauma hospital is essential for the coordination of trauma care. There is currently no standardized protocol that establishes when out-of-hospital personnel must make radio (or phone) contact to the trauma hospital. It is crucial that hospitals are aware of the extent of injury to a trauma patient and the estimated time of arrival to their facility. This allows the emergency department to assemble the appropriate personnel and equipment in a timely manner to best care for the injured patient. The STAC recommends that there be a minimum of two (2) communication contacts by the out-of-hospital personnel, to the receiving trauma hospital, prior to the arrival of the patient to the hospital.

DISPATCH AND EMS COMMUNICATORS

The Emergency Medical Services (EMS) Communicator is the least trained professional within the Wisconsin EMS chain of care. The EMS Communicator is one of the most important components of the trauma care system because they are the first contact to the trauma care system. The EMS Communicator provides call screening and structured questioning in an effort to determine the best utilization of resources (personnel, equipment, and hospitals). They are then responsible for sending the most appropriate resources to assist in the care for the patient. There are national standards for EMS Communicators that include pre-arrival instructions that should be offered to callers according to established protocols.

Currently, standardized EMS communicator training and/or certification of EMS Communicators are not required nor regulated in Wisconsin. As a result, educational levels of individuals medically dispatching and the actual methods of dispatching vary greatly throughout the state.

Due to the importance of providing the most appropriate resources for the injured patients, the STAC recommends that EMS Communicators have standardized emergency medical dispatcher (EMD) education courses. STAC also recommends that the National Standards for Emergency Medical Dispatching be incorporated into the Statewide Trauma Care System. The System Management Committee of the EMS Board is currently preparing "Emergency Medical Communicators, Dispatchers, and Communication Centers: A White Paper", which outlines weaknesses of Wisconsin's current system and provides recommendations for improvements. The STAC has gone on record in support of the document and will continue to work closely with the EMS Board and the Systems Management Committee to improve this vital component of the EMS and Trauma Care System.

Regular performance improvement should be incorporated into the dispatch process so there is a method to monitor the appropriateness of the dispatch communications with the callers and with the out-of-hospital providers. Physicians should take an active role in the performance improvement process and provide sound continuing medical education for EMS Communicators. The Regional Trauma Advisory Councils should maintain an active role in the organization of EMS Communicator education and performance improvement within their region. This organization will facilitate system-wide emergency response coordination.

MEDICAL DIRECTION

Medical Direction is a system in which physician-directed oversight provides professional and public accountability for medical care provided in the out-of-hospital setting. It is important to realize that without the physician's medical expertise and leadership abilities, the EMS system becomes simply a transportation system. In an EMS system, medical direction provides the operational framework and authorization for EMTs and others to provide emergency treatment outside of the hospital. The Wisconsin EMS and IP Handbook (1999) indicates that the ultimate authority and responsibility for patient care remain with the physician, as EMTs work as an

extension of the physician's practice. Medical direction by physicians may be accomplished "on line" (direct voice communication) or "off-line" (protocols, education, evaluation).

Wisconsin requires every ambulance service to submit an operational plan in which they must identify a service medical director ("off-line") and clear guidelines by which on-line medical direction will be established.

Recommended qualifications for a physician providing "on-line" medical direction include:

- ◆ A current Wisconsin medical license and experience in the emergent management of the acutely ill or injured patient
- ◆ Knowledge of the local EMS system design, goals, and operation including protocols and regional triage criteria
- ◆ Knowledge of out-of-hospital care techniques and capabilities of out-of-hospital care providers

Wisconsin currently requires that every EMT-Basic through EMT- Paramedic service has a defined service medical director ("off-line"). In addition, any First Responder services utilizing defibrillation must also have a medical director. Presently there are 238 medical directors that provide medical control to 447 ambulance services. ACEP (1999) defines additional responsibilities of the service medical director as involvement with design, operation, evaluation, and ongoing revision of the system including initial patient access, dispatch, prehospital care, and delivery to the emergency department. EMS rules (HFS 110, HFS 111, and HFS 112) give physicians the responsibility to develop necessary medical policies and procedures. The same EMS rules give physicians the power to limit the activities of those under the medical director's supervision who deviate from the established clinical standards of care or do not meet training standards. The service medical director's primary responsibility is to ensure quality patient care delivery.

To optimize "off-line" medical direction of all out-of-hospital EMS, these services shall be managed by physicians who have demonstrated the following:

- ◆ Wisconsin licensed

- ◆ Familiarity with the design, goals and operation of out-of-hospital EMS systems
- ◆ Experience or training in the out-of-hospital emergency care of the acutely ill or injured patient
- ◆ Experience or training in medical direction of out-of-hospital care providers
- ◆ Active participation in ED management of the acutely ill or injured patient
- ◆ Experience or training in the instruction of out-of-hospital personnel
- ◆ Experience or training in the EMS performance improvement process
- ◆ Knowledge of EMS laws and regulations
- ◆ Knowledge of EMS dispatch and communications
- ◆ Knowledge of skills, equipment, environment and functions of out-of-hospital emergency units.
- ◆ Successful completion of a State approved Medical Director's Course

Because off-line trauma protocols have enormous impact, it is imperative that medical directors actively involved in EMS systems are participating in protocol development and evaluation.

TRIAGE

Identification of the major trauma patient is essential to trauma system design because it describes the patient who will benefit most from regionalized care. It also indirectly determines the level and intensity of resources needed to provide definitive care. Triage includes the process of sorting patients as to severity or injury risk and assigning them to the most appropriate resource for definitive care. Triage decisions are made at the scene during the initial evaluation of the victim. Once made, decisions impacting destination include severity of the injury sustained by the victim, time and distance to a receiving facility, and level of hospital resources available to care for the trauma victim. Triage criteria should provide a basis for the establishment of protocols for patient identification, delivery decisions, and appropriate response at the acute care facilities for all trauma patients in an inclusive system.

The State lead agency in the Wisconsin Statewide Trauma Care System will provide the Minimal Scene Triage Guidelines that will be developed by the Out-of-Hospital Care Issues subcommittee of the STAC, while allowing for the Regional entities to determine further triage criteria based on the resources available within the Region. It is essential in establishing triage criteria that a method of evaluating the effectiveness of the triage tool be implemented. Combining triage criteria with the state and regional performance improvement program will result in triage protocols that efficiently utilize existing resources, are sensitive enough to identify severe injury or moderate to severe injury severity risk, and are specific enough not to overburden the Level I and Level II Trauma Centers.

TRANSPORT

The majority of patients sustaining injury will be able to receive appropriate and definitive care in Level III and Level IV hospitals. However, patients with serious injury require transport to Level I or Level II hospitals. Facilities need to assess their own capabilities for the injured patient. Facilities should insure early identification and transport of the severely injured patient to the most appropriate level of care.

The Lead agency is currently revising the 1996 “Scope of Practice Statement for Interfacility Transfers” document which contains a detailed description of the level of care to be provided by a service; a defined limit of practice; the personnel required to provide the level of care; and the mechanism by which the level of care is established and maintained. This document includes all the components present in current federal and state regulations. A goal of the revised document is to assist hospitals in determining the most appropriate mode and personnel for transfer of their patients to another facility. Another goal of the document is to place flow charts detailing transfer criteria and protocols in every emergency department throughout Wisconsin.

The STAC has recommended that specific references be included in the revised document with respect to the transportation of the trauma patient – this is currently being incorporated into the document.

DEFINITIVE CARE

CLASSIFICATION AND VERIFICATION OF HOSPITAL RESOURCES

Trauma system development seeks to facilitate and coordinate a multidisciplinary system response to the injured patient from the time of injury through the provision of definitive care. It is imperative that injured patients are delivered in a timely manner to the closest appropriate facility. An integrated system of trauma care requires the identification of facilities with the resources to provide optimal care for the injured patient. The identification of facilities is an essential component of an inclusive trauma system. In order to maintain this system, facility standards must be established and evaluated. These standards as well as ongoing system evaluation will assist in improving the delivery of care for all victims of trauma. Standards for trauma facilities and classification levels will be established based on the most current guidelines published by:

- ◆ American College of Surgeons Committee on Trauma (1999): *“Resources for the Optimal Care of the Injured Patient”*
- ◆ American College of Emergency Physicians (1992): *“Guidelines for Trauma Care Plan”*
- ◆ Health Resource and Services Administration (1992): *“Model Trauma Care Plan”*.

These guidelines stress the importance of the extraordinary commitment of hospital resources and personnel, and of having the available resources ready to administer to the needs of the patient in a timely manner.

One of the most important components of trauma system design is the regionalization of trauma facilities and the integration of trauma centers into the EMS system. It is essential to take into consideration the spectrum of care for all victims and the ability of each facility to provide treatment and care for the major trauma victim.

It is the goal of the *Wisconsin Statewide Trauma Care System Plan* to integrate all hospital facilities into an inclusive network in order to provide definitive care to all injured patients throughout the state of Wisconsin.

Trauma Care Facilities:

Level I. *The Level I Trauma Center is a tertiary care hospital that maintains a distinct leadership role in system development, optimal care delivery, evaluation, training and research. It is the regional resource trauma center in a system and has the capability of providing total care for every aspect of injury from prevention to rehabilitation.*

In addition to acute care responsibilities the *Level I* Trauma Center must have a commitment to education, research and system leadership. They provide extensive public outreach and prevention programs. Medical education programs include postgraduate training for trauma and other specialties, as well as programs for other system participants including out-of-hospital providers, trauma nursing staff and community physicians. Research at either the clinical or basic science level is essential.

Level II. *The Level II Trauma Center is a hospital that has made a commitment of resources, personnel and equipment to provide definitive trauma care to injured patients regardless of severity. Level II trauma centers may be the most prevalent in communities, managing the majority of the trauma patients. They differ from the Level I Trauma Centers in their teaching and research capability. Depending on a number of differing factors (geographic location, patient volume, personnel, and resources), the Level II Trauma Center may not provide the same comprehensive trauma care as a Level I Trauma Center and in certain circumstances it may be necessary to transfer the patient.*

The *Level II* Trauma Center may be in rural or urban communities, may be a public or private institution. The key essential component of a *Level II* Trauma Center is the commitment to provide optimal trauma care and the resources and personnel to carry out the mission.

Level III. *The Level III Trauma Center serves communities that may or may not be served by a Level I or Level II Trauma Center, and does not have the resources to meet the criteria to be a Level I or Level II Trauma Center. The Level III Trauma Center facility provides prompt*

assessment, resuscitation, emergency treatment and stabilization. When appropriate the victim will be prepared for transfer to a *Level I or Level II* Trauma Center. The key component of the *Level III* Trauma Center is the availability of on-duty emergency physicians and nurses and a commitment by the facility to maximize the resources it has to care for the trauma victim.

Planning for the care of injured patients in a *Level III* Trauma Center requires these hospitals to have transfer agreements and standardized treatment protocols.

Level IV. *The Level IV Trauma Center is an integral component of the trauma system. This hospital is most often located in sparsely populated communities with limited trauma care resources. In rural areas this allows the trauma system to reach even the most remote locations to provide initial care and ready the victim for transfer. The guidelines for these remote facilities will be flexible in that they are largely dependent on available resources in the community. Establishing realistic standards based on available resources is essential to the development of a rural trauma system. The key component of the Level IV Trauma Center is the strong linkage to the trauma care system and the ability to effect rapid transfer to definitive care based on pre-established treatment and transfer protocols. In a Level IV Trauma Center, it is important to have strong cooperative and coordinated efforts with tertiary care for training, leadership, support, and to ensure that the Level IV Trauma Center is not isolated from the tertiary care available in more urban areas. An inclusive trauma care system should leave no facility isolated without direct linkage to a Level I or Level II Trauma Center.*

Pediatric Trauma Care / Specialized Trauma Care. Infants and children exhibit age-related and development-related responses to injury, which necessitate specific knowledge and skill from care providers. Optimal definitive care for pediatric trauma victims may not be available at trauma centers that are capable of definitive care for adults.

Specialized trauma care must be provided by personnel and facilities with a specific interest and competence in the areas. Spinal cord injury, eye injury, burns and limb reimplantation are examples that demand highly specialized care, facilities, training and organization of specialty teams.

In an effort to address the trauma care needs of these populations, hospitals and out-of-hospital providers, in conjunction with the Regional Trauma Advisory Councils, must develop protocols specific to these populations that reflect the unique needs and demands surrounding their care.

Rehabilitation. Rehabilitation should be integrated into all phases of acute and primary care, and should begin at the earliest stage possible following admission to the acute care hospital. Rehabilitation services are best provided along a continuum beginning with admission to a trauma center and continuing through community reintegration. Each trauma care facility should establish a mechanism to initiate rehabilitation services and/or consultation upon patient admission, as well as policies regarding coordination of transfers between facilities.

CLASSIFICATION / VERIFICATION PROCESS

The lead agency of the statewide trauma care system will utilize criteria to classify each facility according to their commitment to trauma as measured by their resources and personnel. This will be an inclusive system which acknowledges each facility as having a role to play in the optimal care of the trauma patient, and recognizes that trauma patients will present for care at all hospitals in Wisconsin. DHFS may not direct a hospital to establish a certain level of certification, rather each hospital may choose the level they wish to pursue.

Hospitals interested in being verified, as a *Level I* or *Level II* Trauma Center will utilize the methods and criteria established by the American College of Surgeons Committee on Trauma (ACS/COT). These facilities must contact ACS/COT for verification and are responsible for any costs associated with this process. Once verification by ACS is complete, documentation must be forwarded to the State of Wisconsin EMS Section.

Hospitals interested in becoming *Level III* or *Level IV* trauma care facilities will be sent a lead agency-approved self-designation checklist. The checklist would be completed by the hospital facility and returned to the State of Wisconsin EMS Systems & Licensing Section.

1997 Wisconsin Act 154 states that every four (4) years each hospital facility must recertify to the EMS Systems Section the classification level of trauma care services that is being provided by the hospital. **STAC recommends that recertification of facilities occur every 3 years, which is the American College of Surgeon's requirement.**

EVALUATION AND PERFORMANCE IMPROVEMENT

As trauma care facilities and systems have developed, it has become clear that ongoing assessment and re-evaluation of the care of trauma patients within a well-defined Performance Improvement (PI) component is essential to providing optimal patient care. Most programs have focused almost exclusively on specific hospitals. While such facility-based PI is extremely important to the ongoing development of the individual institutions, system-based PI is also

essential because it examines the overall functioning of the system including system management, out-of-hospital care, hospital care and rehabilitation.

While both facility and system performance improvement programs require the collection and analysis of similar data, each evaluates the data from a different perspective. Facility PI evaluates individual patients cared for by specific health care practitioners within a given institution. Conversely, system PI evaluates components of the trauma care system, as well as their interaction with each other. Thus, whether looking at aspects of structure (resources), process (medical care delivered), or outcome (results), facility and system PI have many similarities but differ in their overall approach.

STATE TRAUMA REGISTRY

All trauma PI activities are predicated on the existence of a systematic trauma registry, which should be computerized, whenever possible. It is essential that facility and system registries be compatible with one another to allow for easy transfer of and analysis of data.

The patient population to be included in the trauma care data collection system is a subset of all injured patients; injured patients that require hospitalization and all fatalities should be recorded in the data collection system. Data collection for each system component is the responsibility of all providers in the system. Collating and recording these data are the combined responsibility of the individual provider institutions and the lead agency. State Trauma Registry data can augment a statewide surveillance system when combined with vital statistics, mortality data and other data sources.

Statewide reporting systems have the potential to provide information useful in modifying and improving trauma systems. In addition to evaluating the effectiveness of a trauma system in meeting a community's needs, aggregate data can assist in assessing the appropriateness of trauma standards, developing appropriate trauma injury prevention strategies, and in assessing the extent of resources needed to adequately support and sustain a Statewide Trauma Care System.

Accurate and reliable information on injuries from a statewide perspective is a necessary foundation to guide trauma system performance improvement and injury prevention activities. For optimal usefulness, injury information should be collected in a systematic way that encompasses all victims of major trauma (including deaths from trauma) in the state, and includes all phases of care from out-of-hospital to discharge outcome. Furthermore, injury information should contain sufficient data to allow for risk adjustment, and enable description of trauma patient triage and transfer patterns. The appointment of a State Trauma Registrar will be necessary to coordinate and facilitate these activities.

There are currently nine (9) formal (computerized) trauma registries in Wisconsin. Commercial database platforms used include N-TRACS (4), Tri-Analytics (3), Lancet (1) and Cales (1). The hospital-based trauma registries contain limited information on injured patients who receive their initial care at smaller hospitals without registries and are later transferred to hospitals with registries. The capability for pooling data from multiple sites and generating regional reports exists within one of the database platforms, but is not currently being used.

Other currently existing or planned state databases containing injury-related information include:

- ◆ DHFS, Bureau of Health Information (BHI) – hospital discharge data collected from all Wisconsin hospitals but is limited in its ability to meet the needs of a comprehensive trauma registry by the following:
 - Missing prehospital data elements
 - No means for comparability, i.e. injury severity scoring and risk adjustment
- ◆ BHI Emergency Department Database – in development with plans to submit administrative rules to the Board on Health Care Information (oversight board) in February 2001. Proposed data elements are very similar to the inpatient database elements (predominantly demographic and billing information) with the addition of three ED specific elements: time of admission, means of conveyance to the ED, and EMS response unit ID. Clinical information will not be included, limiting usefulness of this data for risk adjustment and

evaluation of processes of care. There is also no mechanism for linking an individual case in the ED database to a case in the Hospital Discharge database representing the continuation of a particular episode of care.

- ◆ DHFS, EMS Information System (WEMSIS) program data (prehospital) – while some data exists, not all state EMS groups currently participate because submission is voluntary. The program is in the final developmental stage.
- ◆ Crash Outcome Data Evaluation System (CODES) – uses probabilistic methods to link data on injuries reported in the Wisconsin Department of Transportation (DOT) motor vehicle crash records with medical outcome and charge data on types and costs of injuries in the BHI hospital discharge database (supported through United States DOT, Wisconsin DOT and NHTSA grants 1994 – present). CODES may be able to link up to 80% of crash-related hospitalizations to DOT crash information. It should be noted that although motor vehicle crashes are an important cause of injury, other significant mechanisms such as falls, agricultural and industrial injury, and penetrating injury are not included in the CODES project.
- ◆ Death information from coroners – limited by lack of autopsies on many trauma victims; therefore, cause of death is not very specific.

It is important to note that no linkages exist between prehospital data and hospital discharge data, although a current grant proposal has been submitted to explore linkage of DOT crash information and WEMSIS data.

Recommendations for Trauma Registry development and implementation:

- A. Mandatory and systematic injury data collection
 - 1. Level I and Level II Trauma Centers will be required to
 - a) maintain computerized trauma registries

- b) contribute their data to a centralized, statewide repository
 - c) contribute to a region/national database to assist in establishing benchmarks for Wisconsin
 - d) see Appendix E - Proposed Data Elements for Level I and Level II Hospitals
2. Level III and Level IV Trauma Centers will collect and submit data on “major trauma patients”
- a) “Major Trauma” includes any injured person who has been evaluated by a physician, RN or EMS personnel and found to require treatment in a hospital setting with
 - ICD –9 diagnosis codes 800-959.9, and one or more of the following:
 - Injury to more than one body system
 - All trauma admissions to hospital > 24 hours
 - Trauma admission to the ICU / Telemetry
 - All trauma patients that are transferred into or out of the hospital
 - All trauma deaths of admitted and treated patients in the emergency department
 - b) See Appendix F – Proposed data elements for Level III and Level IV Hospitals
3. Data collection and submission to the Wisconsin State Trauma Registry will occur in two phases:

Phase I: Level I and Level II hospitals that currently have computerized trauma registries will submit data electronically to the State Trauma Registry. This information will be supplemented by reports obtained from the BHI hospital discharge database. Target date for completion of Phase I is July 1, 2004.

Phase II: Level III and Level IV hospitals will phase-in data collection and submission in a format that will be determined as database design is developed, and refined. The maximum number of trauma cases fitting submission criteria is

estimated at about 50 per year. The target date for completion of Phase II is July 1, 2007.

4. Data sets may be revised and elements added as needed for ongoing system evaluation and performance improvement as the Trauma Care System develops and matures. For example, data elements may be added to collect additional information on post-hospital functional outcomes and rehabilitation after injury.
- B. DHFS will administer the Wisconsin State Trauma Registry to include oversight of the database, ownership and access, management activities, coordination of data submission and generation of reports. Issues of confidentiality access to data and HIPAA requirements will need to be addressed.
 - C. DHFS will develop a State Trauma Registrar position to coordinate data submission, prepare reports, maintain the database, support ongoing training for Level III and Level IV hospitals, and work with the State Trauma Coordinator to identify system and regional performance improvement opportunities based on registry data.
 - D. DHFS will continue to explore data linkage options among all existing statewide databases containing injury information.

TRAUMA FACILITY AND SYSTEM EVALUATION AND PERFORMANCE IMPROVEMENT

The STAC recommends a method be established to evaluate processes and outcome of care provided in a statewide trauma care system and that a performance improvement plan be included as part of the evaluation. The purpose of the system evaluation plan is to:

- *Improve care*

- *Affect outcomes*
- *Reduce mortality & morbidity*
- *Improve regional trauma care and prevention*

The system evaluation plan will use trauma registry data as the basis for evaluation and system improvement. A performance improvement (PI) program requires regional coordination and a statewide trauma registry to maximize the benefits from the system. The evaluation system, and the trauma system as a whole, should be phased-in to allow for gradual growth that does not overload limited resources.

The current status of PI activities within the state include:

Facilities

- ◆ An organized Trauma Coordinators group, representing hospitals, has begun efforts to coordinate PI activities
- ◆ All Level I and Level II Trauma Centers in Wisconsin that have been verified by the American College of Surgeons (ACS), are required to have a PI process in place. Many other hospitals in Wisconsin have informal PI processes related specifically to trauma care. This usually includes peer review to evaluate specific cases or problems identified in the monitoring process.
- ◆ Many hospitals have limited resources in terms of PI activities (chart abstracters, information systems technology, equipment, etc).

System

- ◆ There is currently limited system evaluation or PI occurring on a regional basis.
- ◆ There are large disparities in resources available for trauma system implementation.
- ◆ There is 1 FTE (full-time employee) state employee to coordinate trauma system activities (Statewide Trauma Coordinator).
- ◆ There is an EMS Advisory Board and related auxiliary EMS committees that provide advice on all EMS issues, but not with an emphasis on trauma or trauma systems and performance improvement. There is no established feedback loop for performance and training program improvement for providers.

- ◆ There is informal regional structure in existence that provides collaboration in some areas of the state. The EMS Advisory Board has made recommendations in a past legislative report about the benefits of regionalization of EMS.
- ◆ Regions need to be defined and the resources within the regions need to be identified and catalogued so the EMS capabilities and hospital resource capabilities within the region are known to all providers.
- ◆ EMS dispatcher training is inconsistent. Dispatchers should be provided with trauma specific algorithms and trauma patient identification criteria. There should be a PI process to review specific dispatch calls.
- ◆ Some areas without advanced life support (ALS) ambulance service need to coordinate care with ground and air ALS services.
- ◆ There are EMT-Basic Trauma Protocols that have been developed by PAC. Currently, there is no standardized statewide trauma protocol for all levels of EMS within the state, nor are there regional protocols with appropriate regional variations.
- ◆ Resources vary widely for proper staffing of interfacility transfer of patients.

Recommendations

- ◆ A performance improvement system must be in place to identify effectiveness of the trauma facilities and system.
- ◆ The Trauma Registry should be the main source of data for statewide and regional PI purposes.
- ◆ Specific performance improvement measures will be addressed during the Statewide Trauma Care System implementation process. Essential vs. expanded data items should be decided by the STAC or similarly appointed advisory body as part of the implementation process. Data items should be decided from three needs: local, regional, and statewide.
- ◆ Regional Trauma Advisory Councils need to be established to facilitate the coordination of PI activities.

REGIONAL TRAUMA ADVISORY COUNCILS (RTACs)

Key to system evaluation and performance improvement is the development of Regional Trauma Advisory Councils (RTACs). These regional councils will also be essential to other parts of the trauma system and therefore great care should be taken in developing and supporting the council structure. The structure of the RTACs would include the following:

- ◆ Membership to a Regional Trauma Advisory Council will be required by all hospitals, providers, and other stakeholders. The boundary formation of the regions will be voluntary, supported by the existing referral patterns and organizational structure. Membership to the RTAC's must be reviewed by the STAC and approved by the State EMS Systems & Licensing Section.
- ◆ Leadership of the RTACs will include elected representatives from stakeholder organizations, and will be rotated to ensure that all stakeholders have a chance to contribute.
- ◆ The Statewide Trauma Coordinator will interface with every RTAC.
- ◆ Regional operations need to be defined and outlined for data collection, reporting and evaluation. The State Trauma Registrar will assist the RTAC's with data collection and reporting functions.
- ◆ Performance Improvement (PI) needs to be done at a regional level to be optimal. The initial focus for the PI system should be to look at small steps for PI, based on what the current system can handle.
- ◆ There needs to be standardized statewide data for comparison, but local systems should have flexibility to address specific needs beyond core criteria.
- ◆ Regional resources must be identified to coordinate a performance improvement program.
- ◆ Based upon PI findings within a region, the RTAC will develop injury prevention and trauma care system education and training programs. The State Injury Education Coordinator will assist the RTAC's with the development of the programs.

RESEARCH

Systems research is necessary to guarantee the ongoing study and improvement of trauma system design, and ultimately, trauma patient outcome. Research should be organized so that certain aspects of injury can be addressed by the system database including injury surveillance and epidemiology, prevention, out-of-hospital treatment, definitive care and rehabilitation information, financial studies and system organizations.

It is of extremely important that research be used to validate the cost effectiveness of trauma care in all settings (urban and rural). Other areas of study that could be identified include reimbursement issues, and studies of the ethical, moral and legal dilemmas facing trauma care.

There are no organized research programs on the state level. However, as the state begins to produce system-level reports, opportunities for research may emerge. Information from the State of Wisconsin Trauma Registry, less patient and hospital identifiers, will be provided by request to any trauma center that seeks to conduct policy research or outcome studies. The DHFS encourages, and supports, any hospital's efforts to conduct trauma research activities.

INJURY PREVENTION EDUCATION AND TRAINING

INJURY - THE PROBLEM

Injury is one of the most under recognized major public health problems facing our country today. Regardless of age, gender, race or ethnicity, injury is a threat to all of us. It is the leading cause of death in people ages 1-44 both in Wisconsin and across the nation and the

fourth leading cause of death for all ages. The National Safety Council (1995) reports that for ages 1 to 34, motor vehicle crashes (MVC) are the most common cause of death. MVC's, work and occupational injuries, injuries at home, and non-motor vehicle public injuries accounted for 92,200 deaths in 1995 which is a rate of 35.4 deaths per 100,000 population. Haupt and Graves (1982) reported that trauma injuries produce 3.6 million hospital admissions each year, with an average of 7 days per hospital stay. More than 4 million potential years of productive life are lost annually as a result of trauma, exceeding the loss produced from heart disease, cancer, and stroke. The annual cost to our nation from injuries is staggering.

Nationally, MVC's are responsible for 50 percent of the costs related to the treatment of and recovery from traumatic injuries. In Wisconsin, the Department of Transportation (1999) reported that 744 persons were killed in motor vehicle crashes in 1999 (36% involved alcohol, 27% involved speed, and 14% involved both speed and alcohol). Wisconsin Department of Transportation statistics also reveal that 61,577 persons were injured in 41,345 reported injury crashes and 674 fatal crashes in 1999.

A health problem can be examined by its cost to society, but this cost does not encompass the grief, pain, and social disruption experienced by an individual and family. Indicators used to compare the impact of health problems are cost to society, physician contacts, and hospital admissions. Injury remains one of the most expensive health problems. Their cost to society is unknown. According to Bonnie, Fulco and Liverman (1999), the total cost estimate for injury in 1996 for the nation was \$260 billion.

Baker, O'Neill and Karpf (1992) reported that injury ranks first in the nation for the reason for physician visits and contacts for treatment: in 1995, there were 2.5 million hospital discharges from injury and 37 million emergency department visits. Heart disease was second and respiratory disease third. Injuries account for about 3.6 million hospital admissions yearly, which is 1 out of every 10 short-term admissions. The number of admissions for injury among all ages groups is higher than for all other diseases except circulatory and digestive disorders.

For every injury death, there are approximately 18 hospitalizations, 233 emergency department visits, and 450 physician visits. Nationally more than 30 million emergency department visits are a result of nonfatal injuries every year with more than 72,000 people disabled by injuries.

Through education and training, injuries can be prevented. The individuals that are creating the Wisconsin Trauma Care System must insure that effective systems of prevention education activities are an integral part of that system. The goals of the trauma system are to ultimately prevent injuries from occurring and to reduce the severity of injuries once they do occur.

EDUCATION AND TRAINING

An essential component of an effective trauma care system will be the education and training program. There are many opportunities for prevention education. The entire population of Wisconsin is a target for trauma, therefore all citizens would benefit from prevention education activities. Injury prevention and control requires an organized approach with collaboration between governmental agencies, private organizations, and individuals to identify specific problems and to develop and implement control strategies designed to decrease the incidence of injury.

The education and training program will function within three levels. These three levels, the (3) “P’s”, include:

1. *Population* – the recipients of injury prevention education and cares provided when an injury occurs.
2. *Providers* – individuals providing primary care and individuals/agencies/facilities providing 2° & 3° prevention to injured patients and programmatic leadership for injury prevention and trauma education and training across the state.
3. *Policymakers/Decision makers* – this group affect injury prevention by virtue of what they decide to do or not do.

The ULTIMATE GOAL of the Statewide Trauma Care System is to PREVENT DISABILITY AND DEATH DUE TO INJURY

The goals of the Injury Prevention – Education and training program will be to:

1. Improve coordination among the many injury prevention advocates from both the public and private sector to reduce fragmentation and create a systematic approach to injury control.
2. Develop strategies to increase the population (3 –P's) awareness of injury as a preventable public health problem. Strategies should also include awareness of the trauma system and access to that system.
3. Provide education and training programs for the public and policymakers as well as the providers that include prevention as a key focus to prevent disability and death from traumatic injury.
4. Serve as a clearinghouse for existing injury data resources, trauma-related activities and organizations, as well as prevention activities within the state.
5. Evaluate the effectiveness of the trauma system education and prevention programs and activities based on data, run reviews and other performance improvement activities established by the trauma hospitals across the state. Utilize the Regional Trauma Advisory Council information from the data sources to identify the incidence and factors associated with specific injuries within each Region.

As the Trauma System and the Regions within the system are developed and implemented, it will be essential to link system goals and objectives to the injury problem identified so that high-risk groups can be targeted and community resources coordinated.

STAC recommends the following plan for the phase-in of injury prevention – education and training:

Phase I – Primary Education of the Statewide Trauma Care System

- ◆ This phase will be completed prior to the implementation of the trauma care system

- ◆ The audience will be the 3 P's
- ◆ A standardized presentation will be given by a multidisciplinary team who will provide specific perspectives to the focused audience. For example: education of scene triage protocols will be emphasized in the presentation to EMS providers.
- ◆ Information will include education regarding the components of a trauma system, their role within the system, and how to access the system

Phase II – *Continuing Education and Training*

- ◆ Define educational needs of personnel based upon verification process and develop strategies to facilitate these needs
- ◆ EMS continuing education will include a trauma component
- ◆ Identify leading causes of injury in Wisconsin and within each Region of the State of Wisconsin
- ◆ Education for the utilization of data collection activities
- ◆ Utilization of Trauma Care System evaluation and PI to focus education on strategies for injury control within each Region and statewide
- ◆ Promote the development of policies and legislation driven by the trauma care system and Trauma Registry
- ◆ The STAC and DHFS will facilitate the development of a statewide injury coordinating structure.

SUMMARY

The time is right to develop and implement a statewide trauma care system in Wisconsin. Injury continues to be a major public health problem. Injury is a disease that public health care professionals and policymakers can positively impact. To delay implementation of a Statewide Trauma Care System only means that additional members of our communities will continue to suffer needless death and disability. Trauma systems work to decrease mortality and morbidity. This Trauma Report is Wisconsin's effort to enhance the health of all citizens through a

comprehensive and systematic approach to trauma system development and care. This Report is inclusive in that it provides opportunities for participation by all out-of-hospital providers, hospital and rehabilitation facilities, and health care practitioners. It builds on the progressive EMS system that is already in place. This Report is unique in that it takes into consideration the geographical differences within the state, as well as the differences in health care resources throughout Wisconsin.

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APPENDIX A

ACT 154

1997 Assembly Bill 638

Date of enactment: April 21, 1998

Date of publication*: May 5, 1998

1997 WISCONSIN ACT 154

AN ACT to create 15.197 (25) and 146.56 of the statutes; relating to: creating a statewide trauma care system, granting rule-making authority and making an appropriation.

The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. 15.197 (25) of the statutes is created to read:

15.197 (25) TRAUMA ADVISORY COUNCIL. (a) There is created in the department of health and family services a trauma advisory council. The trauma advisory council shall consist of the following members who have an interest and expertise in emergency medical services and who are appointed by the secretary of health and family services:

1. Four physicians who represent urban and rural areas.
2. Two registered nurses, as defined in s. 146.40 (1) (f).
3. Two prehospital emergency medical services providers, including one representative of a municipality.
4. Two representatives of a rural hospital.
5. Two representatives of an urban hospital.
6. One member of the emergency medical services board.

(b) In appointing the members under par. (a), the secretary of health and family services shall ensure that all geographic areas of the state are represented.

(c) This subsection does not apply beginning on July 1, 2001.

SECTION 2. 146.56 of the statutes is created to read:

146.56 STATEWIDE TRAUMA CARE SYSTEM. (1) Not later than July 1, 2001, the department shall develop and implement a statewide trauma care system. The department shall seek the advice of the statewide trauma advisory council under s. 15.197 (25) in developing and implementing the system.

(2) The department shall promulgate rules to develop and implement the system. The rules shall include a method by which to classify all hospitals as to their respective emergency care capabilities. The classification rule shall be based on standards developed by the American College of Surgeons. Within 180 days after promulgation of the classification rule, and every 4 years thereafter, each hospital shall certify to the department the classification level of trauma care services that is provided by the hospital, based on the rule. The department may require a hospital to document the basis for its certification. The department may not direct a hospital to establish a certain level of certification.

SECTION 3. Nonstatutory provisions.

(1) STATEWIDE TRAUMA CARE SYSTEM; REPORT. The department of health and family services and the statewide trauma advisory council shall prepare a joint report on the development and implementation of a statewide trauma care system. The report shall make recommendations on issues that need to be resolved in developing and

* Section 991.11, WISCONSIN STATUTES 1995-96: Effective date of acts. "Every act and every portion of an act enacted by the legislature over the governor's partial veto which does not expressly prescribe the time when it takes effect shall take effect on the day after its date of publication as designated" by the secretary of state [the date of publication may not be more than 10 working days after the date of enactment].

- 2 -

implementing the system, including minimum services in rendering patient care; transport protocols; area trauma advisory councils and plans; development of a method to classify hospitals as to their respective emergency care capabilities and methods to make the resulting information available for public use; improving the communications systems between hospitals and prehospital elements of the trauma care system; development of a statewide trauma registry, including a data system to measure the effectiveness of trauma care and to develop ways to promote ongoing quality improvement; triage; interfacility transfers; enhancing the training and education of health care personnel involved in the provision of trauma care services; and monitoring adherence to rules. Not later than January 1, 2000, the department and the statewide trauma advisory council shall submit the report to the legislature in the manner provided under section 13.172 (2) of the statutes, to the joint committee on finance of the legislature as provided in subsection (2), to the governor and to the emergency medical services board.

1997 Assembly Bill 638

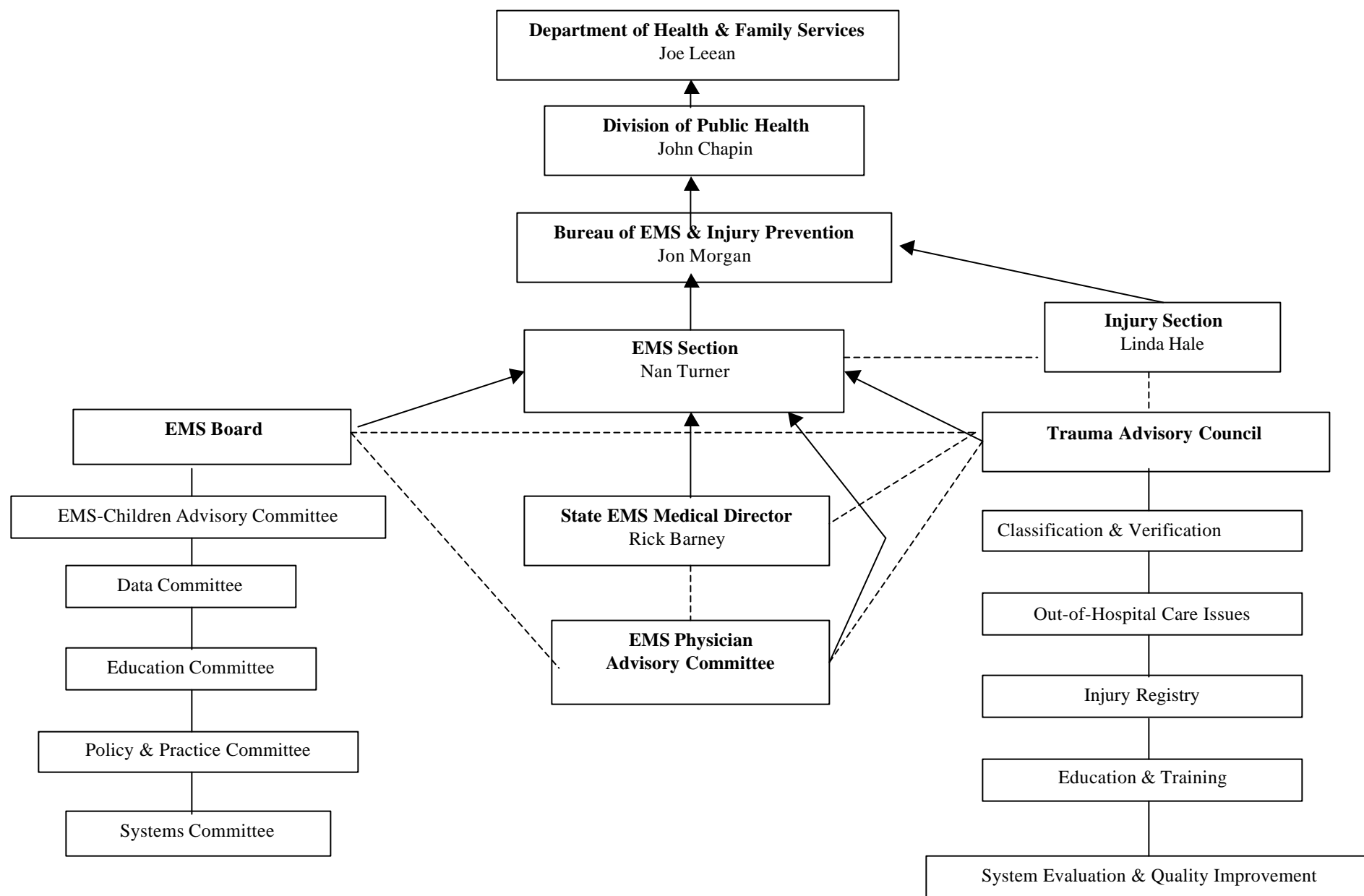
(2) JOINT COMMITTEE ON FINANCE REVIEW. The department of health and family services shall submit the report under subsection (1) to the joint committee on finance of the legislature for its review under section 13.10 of the statutes. The department of health and family services may not submit the rules under section 146.56 (2) of the statutes, as created by this act, to the legislative council staff for review under section 227.15 of the statutes until the joint committee on finance approves the report under subsection (1).

SECTION 4. Appropriation changes.

(1) STATEWIDE TRAUMA CARE SYSTEM. In the schedule of the statutes, to the joint committee on finance of the legislature as provided in subsection (2) under section 20.005 (3) of the statutes for the appropriation to the department of health and family services under section 20.435 (1) (a) of the statutes, as affected by the acts of 1997, the dollar amount is increased by \$8,000 for fiscal year 1998-99 to fund the activities of the statewide trauma advisory council under section 15.197 (25) of the statutes, as created by this act.

APPENDIX B

ORGANIZATIONAL CHART



APPENDIX C

Trauma System Funding Sources Other States

State EMS System Funding - Revenue/Expense Summary

State	Total Revenue	Funds Distributed To EMS Providers	Other EMS Operations Expenses	Total Expenses	State Population	Provider Agencies /Svcs.	Lic'd./ Cert'd. Personnel	EMS Ops FTEs (State/ Regions)	Total Revenue Per Capita	Funds Dist To EMS Providers Per Capita	Other Ops. Expenses Per Capita	Total Expenses Per Capita
Arkansas	1,239,680	270,000	600,000	870,000	2,350,725	240	6,400	14	\$0.53	\$0.11	\$0.26	\$0.37
Delaware	8,786,622	7,174,400	1,612,222	8,786,622	743,606	65	2,000	15	\$11.82	\$9.65	\$2.17	\$11.82
Florida	12,930,047	8,318,847	4,590,598	12,909,445	15,594,318	248	33,976	56	\$0.83	\$0.53	\$0.29	\$0.83
Hawaii	35,748,964	31,207,240	4,541,724	35,748,964	1,300,000	4	456	12	\$27.50	\$24.01	\$3.49	\$27.50
Idaho	2,168,487	92,192	1,753,754	1,845,946	1,228,684	201	3,529	22	\$1.76	\$0.08	\$1.43	\$1.50
Illinois	4,266,139	2,335,000	1,931,139	4,266,139	12,045,000	702	35,000	23	\$0.35	\$0.19	\$0.16	\$0.35
Iowa	1,843,000	730,000	1,113,000	1,843,000	3,000,000	883	13,900	16	\$0.61	\$0.24	\$0.37	\$0.61
Kentucky	3,844,136	2,436,381	1,529,947	3,966,328	3,935,000	261	14,116	22	\$0.98	\$0.62	\$0.39	\$1.01
Louisiana	1,130,000			1,000,000	4,000,000	72	22,000	6	\$0.28	\$0.00	\$0.00	\$0.25
Maine	1,262,500	50,000	1,212,500	1,262,500	1,200,000	275	4,700	27	\$1.05	\$0.04	\$1.01	\$1.05
Maryland	8,989,041	750,000	8,239,041	8,989,041	5,200,000	26	28,964	94	\$1.73	\$0.14	\$1.58	\$1.73
Minnesota	3,926,883	2,297,228	1,629,655	3,926,883	4,782,264	300	25,000	30	\$0.82	\$0.48	\$0.34	\$0.82
Missouri	976,000				5,450,000	235	10,290	19	\$0.18	\$0.00	\$0.00	\$0.00
Montana	1,291,811		1,287,691	1,287,691	889,000			11	\$1.45	\$0.00	\$1.45	\$1.45
Nebraska	1,354,322	250,000	1,024,322	1,274,322	1,661,000	364	8,385		\$0.82	\$0.15	\$0.62	\$0.77
New Hampshire	862,591		862,591	862,591	1,200,000	291	4,130	15	\$0.72	\$0.00	\$0.72	\$0.72
New Jersey	5,063,556	4,251,556	812,000	5,063,556	7,748,063	742	23,330	26	\$0.65	\$0.55	\$0.10	\$0.65
New Mexico	5,357,000	2,500,000	3,000,000	5,500,000	1,500,000	400	6,000	24	\$3.57	\$1.67	\$2.00	\$3.67
North Carolina	4,359,705	1,655,462	2,704,243	4,359,705	7300000	792	28,402	38	\$0.60	\$0.23	\$0.37	\$0.60
Rhode Island	513,525		513,525	513,525	990,000	85	4,279	4	\$0.52	\$0.00	\$0.52	\$0.52
South Carolina	3,035,076	1,512,046	1,523,030	3,035,076	3,417,000	98	5,876	21-S/8-R	\$0.89	\$0.44	\$0.45	\$0.89
South Dakota	901,800	65,000	836,800	901,800	700,000	148	4,000	6	\$1.29	\$0.09	\$1.20	\$1.29
Utah	3,365,490	1,700,000	1,665,490	3,365,490	2,121,083	224	10,300	26	\$1.59	\$0.80	\$0.79	\$1.59
Vermont	502,555		502,555	502,555	600,000	170	3500	8	\$0.84	\$0.00	\$0.84	\$0.84
Virginia	11,210,000	8,097,500	3,112,500	11,210,000	6,872,912	809	33,078	31/27	\$1.63	\$1.18	\$0.45	\$1.63
Wisconsin	3,334,000	2,200,000	1,134,000	3,334,000	5,200,000	450	17,000	11	\$0.64	\$0.42	\$0.22	\$0.64
Wyoming	700,000	75,000	625,000	700,000	480,000	75	2,500	9	\$1.46	\$0.16	\$1.30	\$1.46

State Trauma System Funding Revenue Sources

State	State Population	Total Revenue	Does State Have Specific Trauma Revenue Source?	Trauma System Maintenance Revenue	Trauma Revenue Source
Arkansas	2,350,725	1,239,680	Yes	47,000	10% of EMS Revolving Fund
Delaware	743,606	8,786,622			
Florida	15,594,318	12,930,047	Yes	1,638,782	\$0.10 per Vehicle Registration
Hawaii	1,300,000	35,748,964			
Idaho	1,228,684	2,168,487			
Illinois	12,045,000	4,266,139		50,000	MV Moving, DUI, Firearm/Drug Fines
Iowa	3,000,000	1,843,000			
Kentucky	3,935,000	3,844,136			
Louisiana	4,000,000	1,130,000	No		
Maine	1,200,000	1,262,500	No		Variable; Fees for Trauma Ctr. Desig.
Maryland	5,200,000	8,989,041			
Minnesota	4,782,264	3,926,883			
Missouri	5,450,000	976,000			
Montana	889,000	1,291,811			
Nebraska	1,661,000	1,354,322		100,000	General Funds
New Hampshire	1,200,000	862,591			
New Jersey	7,748,063	5,063,556			
New Mexico	1,500,000	5,357,000	Yes	120,000	EMS Fund Act Annual Appropriation
North Carolina	7300000	4,359,705			
Rhode Island	990,000	513,525			
South Carolina	3,417,000	3,035,076			
South Dakota	700,000	901,800			
Utah	2,121,083	3,365,490			
Vermont	600,000	502,555			
Virginia	6,872,912	11,210,000			
Wisconsin	5,200,000	3,334,000		80,000	Ambulance Inspection Fees (Transp.)
Wyoming	480,000	700,000	Yes	200,000	State General Fund Appropriation

"Non-Lapsing"/"Revolving"/"Enterprise" Funds As Revenue Sources

State	State Population	Total Revenue	Non-Lapsing Funds Amount	Revenue Sources Which Go Into "Non-Lapsing"/"Revolving"/"Enterprise" Fund
Arkansas	2,350,725	1,239,680	743,500	State Revenue Funds, EMSC Funds
Delaware	743,606	8,786,622	8,397,622	General Fund, Special State Fund For Paramedic Services
Florida	15,594,318	12,930,047		
Hawaii	1,300,000	35,748,964		
Idaho	1,228,684	2,168,487	1,666,032	Motor Vehicle and Driver Registration Fees
Illinois	12,045,000	4,266,139		
Iowa	3,000,000	1,843,000	70,000	Specialty License Plates, Certification/Late/Endorsement Fees
Kentucky	3,935,000	3,844,136		
Louisiana	4,000,000	1,130,000		
Maine	1,200,000	1,262,500	77,500	Service, Vehicle, and Exam Fees; Other Charges
Maryland	5,200,000	8,989,041	322,820	Service License Fees
Minnesota	4,782,264	3,926,883		
Missouri	5,450,000	976,000		
Montana	889,000	1,291,811		
Nebraska	1,661,000	1,354,322		
New Hampshire	1,200,000	862,591		
New Jersey	7,748,063	5,063,556	1,000,000	EMT Training Fund Maintains Balance Of \$7,000,000
New Mexico	1,500,000	5,357,000		
North Carolina	7300000	4,359,705		
Rhode Island	990,000	513,525		
South Carolina	3,417,000	3,035,076		
South Dakota	700,000	901,800		
Utah	2,121,083	3,365,490	1,204,425	Surcharge on Criminal Fines, Personnel/Service/Vehicle Fees
Vermont	600,000	502,555		
Virginia	6,872,912	11,210,000	11,000,000	Surcharge On Motor Vehicle Registration
Wisconsin	5,200,000	3,334,000		
Wyoming	480,000	700,000		

Note: Does Not Include Federal EMS-C Funds Which May Be Carried Forward

Federal Funds as EMS System Revenue Sources

State	Total Revenue - All Sources	Federal Preventive HHS Block Grant	Federal NHTSA 401 Revenue	Federal NHTSA 402 Revenue	Federal EMS-C Grant Revenue	Other Grant Fund 1 Revenue	Other Grant Fund 1 Revenue -- Sources	Other Grant Fund 2 Revenue	Other Grant Fund 2 Revenue -- Sources
Arkansas	1,239,680				36,075				
Delaware	8,786,622		139,000		250,000				
Florida	12,930,047				100,000				
Hawaii	35,748,964				100,000	127,100	CDC Bioterrorism Grant		
Idaho	2,168,487								
Illinois	4,266,139		175,000		100,000				
Iowa	1,843,000	515,000		78,000	100,000				
Kentucky	3,844,136								
Louisiana	1,130,000	550,000		50,000	100,000	80,000	Office of Rural Health		
Maine	1,262,500	85,000		50,000	100,000				
Maryland	8,989,041				25,000				
Minnesota	3,926,883	183,600			269,470				
Missouri	976,000	484,000							
Montana	1,291,811	176,000		114,400	322,834	240,000	CDC Trauma System Development	45,000	Critical Access Hospital
Nebraska	1,354,322	459,113			125,000	28,000	Critical Access Hospital Grant		
New Hampshire	862,591				100,000				
New Jersey	5,063,556	375,000			100,000				
New Mexico	5,357,000	1,000,000			90,000				
North Carolina	4,359,705	213,128		403,907	100,000				
Rhode Island	513,525				100,000				
South Carolina	3,035,076	179,404		145,938	100,000				
South Dakota	901,800			470,000		65,000	Critical Access Hospital		
Utah	3,365,490	34,665		40,000	100,000				
Vermont	502,555	139,397		9,500	66,943				
Virginia	11,210,000			50,000					
Wyoming	700,000	112,000		45,000	60,000	60,000	Rural Hospital Flexibility Act		

State Funds as EMS System Revenue Sources

State	Total Revenue - All Sources	General Fund Revenue	Special State Fund 1 Revenue	Special State Fund 1 Rev. Source	Special State Fund 2 Rev.	Special State Fund 2 Rev. Source	Service License Fees (Per Fee)	Vehicle License Fee (Per Fee)	Personnel License Fee (Per Fee)	Other Fee Rev. Source	Other Grant Fund 1 Rev.	Other Grant Fund 2 Rev.	Other Source 1 Rev. Source	Other Source 2 Rev.	Other Source 2 Rev. Source
Arkansas	1,239,680	496,180	475,000	S1			126,000	\$525	61,425	\$105	45,000	\$10			
Delaware	8,786,622	1,223,222	7,174,400	S2											
Florida	12,930,047		1,638,782	S15	9.6 Million	S16	See Other	See Other	\$25	See Other	1,495,000	PP			
Hawaii	35,748,964	35,521,864													
Idaho	2,168,487	205,543	1,203,940	S3	462,092	S12				16,555	\$25 or \$35	280,357	AA		
Illinois	4,266,139	1,402,489	750,000	S4	1,500	S13		50,000	\$25	88,650	\$25	45,000	BB	200,000	EE
Iowa	1,843,000	1,080,000												25,000	HH
Kentucky	3,844,136	3,603,323	1,000,000	S19			18,350	\$80 Or \$20		134,380	\$13/19/35			88,084	II
Louisiana	1,130,000		100,000	S17					100,000		150,000	JJ			
Maine	1,262,500	950,000					27,500	\$100	25,000	\$60		25,000	JJ		
Maryland	8,989,041		8,501,799				322,820	\$780						139,422	JJ
Minnesota	3,926,883	2,684,224	789,589	S5			\$48		\$24						
Missouri	976,000	496,000													
Montana	1,291,811	345,457					4,120	\$35		44,000	Variable				
Nebraska	1,354,322	542,209	200,000	S6											
New Hampshire	862,591	862,591					1,000		1,500	\$20/2yrs					
New Jersey	5,063,556	337,000	375,000	S7	250,000	S14	100,760	\$100/2yrs \$1500 or \$500	161,540	\$100		14,950	Fines	423,306	FF 1,894,000 GG 32,000 KK 1,000,000 OO
New Mexico	5,357,000	1,000,000	3,000,000	S8						92,000		175,000	CC		
North Carolina	4,359,705	3,642,670													
Rhode Island	513,525	413,525													
South Carolina	3,035,076	2,585,734	24,000	S9											
South Dakota	901,800	365,000							1,800		\$25				0
Utah	3,365,490	989,300	1,800,000	S10			20,000	\$100	20,000	\$50	175,125	\$75			186,400 LL
Vermont	502,555	191,684												95,031	MM
Virginia	11,210,000		11,000,000	S11							10,000	DD		150,000	NN
Wisconsin	3,334,000	2,670,000	80,000	S18											
Wyoming	700,000	423,000													

State Special Funds Revenue Sources	
S1 -- EMS Revolving Fund	S11 -- \$2 Surcharge On Motor Vehicle Registration.
S2 -- Pays 60% Of Paramedic Costs	S12 -- \$2/Drivers License (Quadrennial)
S3 -- \$1 Vehicle Registration (Annual)	S13 -- Cook County Hospital Trauma Service
S4 -- Purchase AEDs	S14 -- EMS Youth Trauma
S5 -- 90% Of Seat-Belt Violation Fines	S15 -- Trauma, Motor Vehicle Registration
S6 -- Special Training Fund	S16 -- Traffic Fine Surcharge
S7 -- EMS First Responder Defibrillation	S17 -- \$10 DWI License Reinstatement Fee
S8 -- EMS Fund Act Annual Appropriation	S18 -- Ambulance Inspection Fees (Transp.)
S9 -- Surcharge On DUI Fines	S19 -- Poison Control Center Pass-Through Funds
S10 -- 25% Surcharge On Criminal Fines	

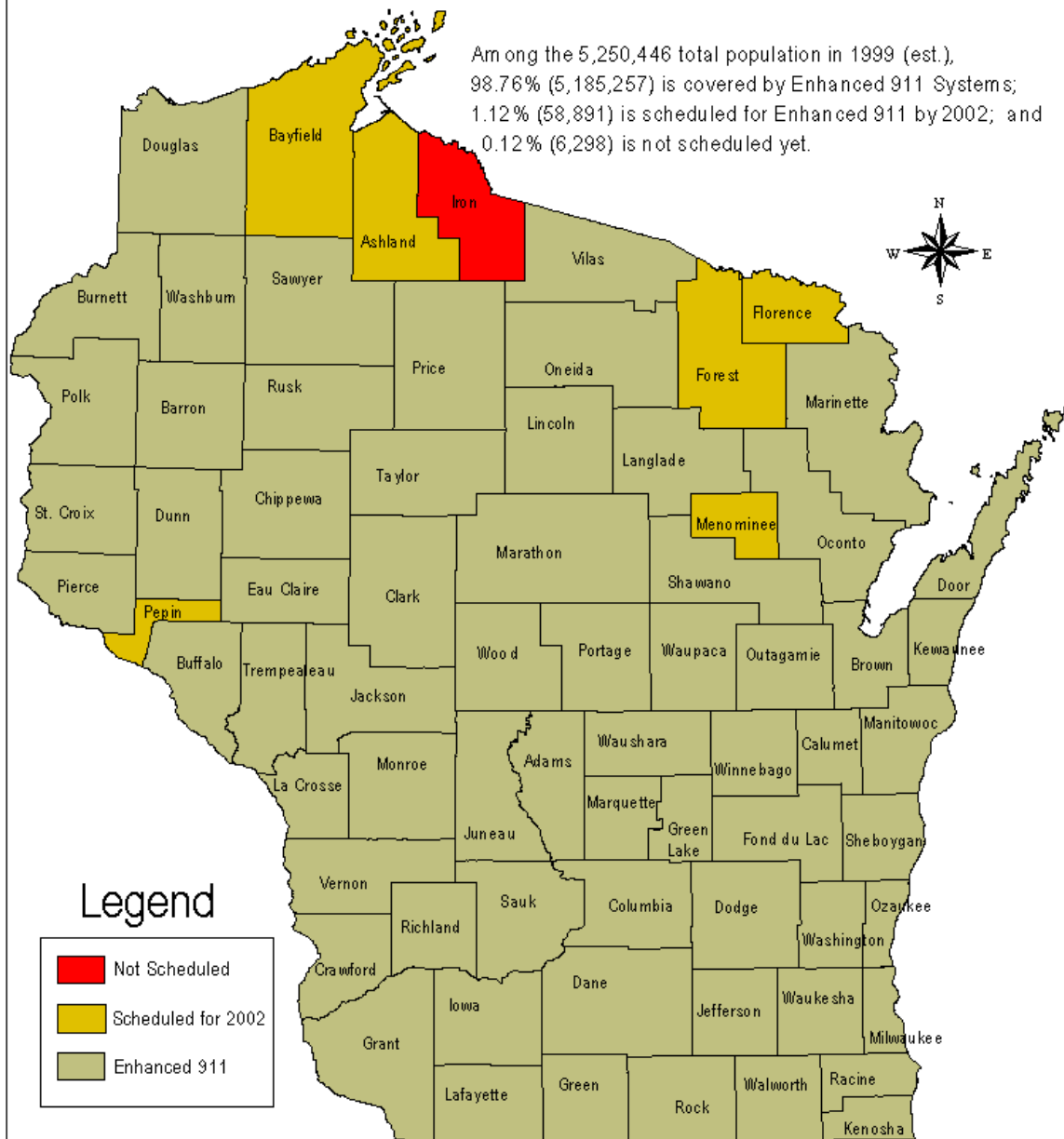
Other State Funds Revenue Sources	
AA -- Commo Contracts, Medicaid, et al.	II -- Other Agency Funds
BB -- Certification, Late, Endorsement Fees	JJ -- Exam Fees, Other Fees
CC -- WIPP EMS Preparedness	KK -- Cost Of Living For Grantees
DD -- Subscription Fees, Trauma Site Fees	LL -- CSEPP,U Of U Research, Disaster
EE -- Regional Ambulance Grants Program	MM -- Medicaid Administrative. Recovery
FF -- Poison Information Center	NN -- Registration Fees For Training
GG -- Helicopter Grant	OO -- EMT Training Fund
HH -- Specialty License Plates	PP -- All License Fees Combined

APPENDIX D

911 Coverage in Wisconsin

911 Systems in WI Counties

Among the 5,250,446 total population in 1999 (est.),
98.76% (5,185,257) is covered by Enhanced 911 Systems;
1.12% (58,891) is scheduled for Enhanced 911 by 2002; and
0.12% (6,298) is not scheduled yet.



0 10 20 30 Miles

Map Produced By:



Date: Nov., 2000

APPENDIX E

Proposed Data Elements for Level I and Level II Hospitals

Proposed Data Elements for Level I & II Hospitals

Level 1 and 2 trauma centers will submit data from their trauma registries for all patients meeting the following criteria:

- ICD-9 discharge diagnosis 800.00 – 959.9
 - excluding 905-909 (late effects of injury)
 - excluding 910-924 (blisters, contusions, abrasions, insect bites)
 - excluding 930-939 (foreign bodies)
 - excluding drowning, unless consequence of MVC
 - excluding strangulation/asphyxiation
 - excluding poisoning or drug overdose
 - excluding falls from same level resulting in isolated distal extremity fracture or hip fracture with > 23 hr hospital stay or transferred to another facility for trauma care
- OR
- Injury-related death in the ED or after hospital admission
- Facility-specified trauma response has been activated

DEMOGRAPHICS

Facility submitting data

Unique patient / record identifier

Race

Gender

Age

Home zip code

INJURY

Date of injury

Time of injury

Zip code / county of injury

blunt or penetrating

injury site / location

E code

Protective / safety devices

PREHOSPITAL

Primary transport from scene (ambulance, helicopter, police, private vehicle, etc)

EMS service/run sheet number

EMS scene time

Scene GCS

Scene VS

Extrication required yes/no

REFERRING HOSPITAL

Hospital transfer yes/no

ID # of referring hospital

Arrival date

Arrival time

Discharge date

Discharge time
Total GCS

RTS
Met transfer criteria yes / no

ED ADMISSION

ED arrival date
ED arrival time
Mode of transfer if from another facility ED discharge date
ED discharge time
Initial GCS
Initial RTS
Drug & alcohol screens done?
ETOH level

HOSPITAL

Post ED destination (expired, OR, ICU, general care, transfer)
Admitting physician / specialty
ICD-9 diagnosis codes (all)
Procedure codes (all)
ISS
Calculated probability of survival
FIM scores
Discharge date
Discharge outcome dead / alive
Organ donation yes/no
Discharge destination (home, rehab facility, other acute care facility, SNF, morgue, jail, etc)
Total hospital days
Total ICU days
Payor source(s)
Billed hospital charges

APPENDIX F

Proposed Data Elements for Level III and Level IV Hospitals

Proposed Data Elements for Level III and IV Hospitals

1. Year 1 following trauma system implementation, state trauma registry data submission will be required from Level 1 & 2 facilities only. Data submission from Level 3 & 4 hospitals will be phased-in beginning year 2.
2. Initial Level 3 & 4 hospital data submission will be on paper with data entry coordinated by the state trauma registrar. The registrar, with support from trauma coordinators of area Level 1 and 2 centers, will oversee education on patient identification & data collection to support ongoing development of expanded data collection and electronic data submission for the Level 3 & 4 hospitals.
3. Level 3 & 4 hospitals will submit data for all **major trauma patients** as defined below.

Major trauma patient: an injured person who has been evaluated by a physician, RN or emergency medical services personnel and found to require medical treatment in a hospital setting, with one or more ICD-9 diagnosis codes in 800-959.9 range AND one or more of the following: injury to more than one body system, hospital stay >24 hours, death in the hospital (includes ED deaths prior to hospital admission), transfer to another facility for trauma care.

GENERAL

- * Facility submitting data
- *0 *Unique identifier for record tracking*
 - o *Race*
- * Gender
- *0 Age
- * County of residence
- o Date of injury
- o Time of injury
- *0 Cause of injury (E code)
- o Injury type - blunt vs. penetrating
- o Protective devices
- *0 Place of injury (E code)
- o *Injury location (address, county)*

PREHOSPITAL

- o Primary transport from scene (ambulance, helicopter, police, private vehicle, etc)
 - o EMS service/run sheet number
- Extrication required yes/no

HOSPITAL

ED arrival date
ED arrival time

Drug & alcohol screens done? Results?

Post ED destination (OR, ICU, general care, transfer)
Admitting physician / specialty

- * Discharge date
- * Discharge outcome dead / alive
- * Discharge destination (home, rehab facility, other acute care facility, SNF, morgue, jail, etc)
- * Total hospital days
- * ICD-9 diagnosis codes (up to 5)
- * Procedure codes for injuries (up to 5)
- * Payor source(s)
- * Billed hospital charges

TRANSFER STATUS

Transfer to another facility yes/no

Receiving facility name/code

Mode of transport to receiving facility

Transport personnel accompanying patient (EMT, RN, MD, etc)

Met transfer criteria yes/no*OHCI elements

◦ WEMSIS elements